

Ch 6 (Extra)  
Sum and Product of Roots;  
Writing Equations when given  
the roots

Given the solution set, write the equation.

ex 1:  $\{-5, 3\}$   $(x+5)(x-3) = 0$

$\text{sum} = -2$   
 $\text{prod} = -15$   $x^2 + 2x - 15 = 0$

ex 2:

$\{4, 6\}$   $(x-4)(x-6) = 0$

$\text{sum} = 10$   
 $\text{prod} = 24$   $x^2 - 10x + 24 = 0$

$$x^2 - (\text{sum})x + \text{product} = 0$$

Given the solution set, write the equation.

ex 3:  $\{-0.5, 4\}$   $x^2 - 3.5x - 2 = 0$

$\text{sum} = 3.5$   
 $\text{prod} = -2$   $2x^2 - 7x - 4 = 0$

~~Create a common denominator or:~~

$$ax^2 + bx + c = 0 \quad (\text{Factor out } a)$$

$$a\left(x^2 + \frac{b}{a}x + \frac{c}{a}\right) = 0$$

$$x^2 - (\text{sum})x + \text{product} = 0$$

$$\text{sum} = \frac{-b}{a}$$

$$\text{product} = \frac{c}{a}$$

Write the equation given the roots:

ex 4:

$$\left\{-\frac{1}{2}, \frac{3}{4}\right\}$$

$$8x^2 - 2x - 3 = 0$$

$$\begin{aligned} \text{sum} &= \frac{1}{4} \\ \text{prod} &= -\frac{3}{8} \end{aligned}$$

Write the equation given the roots:

ex 5:

$$\left\{\frac{2+i}{3}\right\}$$

$$\text{sum} = \frac{2+i}{3} + \frac{2-i}{3}$$

$$\text{sum} = \frac{4}{3}$$

$$\text{product} = \frac{(2+i)(2-i)}{9}$$

$$\text{product} = \frac{5}{9}$$

$$x^2 - \frac{4}{3}x + \frac{5}{9} = 0$$

$$9x^2 - 12x + 5 = 0$$

Find k such that  
 $4x^2 + kx - 15 = 0$   
 has a root of  $\frac{3}{4}$

$$\begin{aligned} -\frac{k}{4} &= \frac{3}{4} - \frac{20}{4} \\ -\frac{k}{4} &= -\frac{17}{4} \\ k &= 17 \end{aligned}$$

$$\begin{aligned} \text{sum} &= -\frac{b}{a} \\ \text{product} &= \frac{c}{a} \end{aligned} \left\{ \begin{aligned} -\frac{k}{4} &= \frac{3}{4} + r \\ -\frac{15}{4} &= \frac{3}{4}r \end{aligned} \right. \begin{aligned} &\uparrow r = -5 \end{aligned}$$

Find k such that  
 $x^2 - 2x + k = 0$  has  
 a root of  $1 - \sqrt{7}$

$$\begin{aligned} \text{sum} &= -\frac{b}{a} & 2 &= 1 - \sqrt{7} + r \\ & & 1 + \sqrt{7} &= r \\ \text{prod} &= \frac{c}{a} & k &= (1 - \sqrt{7})r \\ & & k &= (1 - \sqrt{7})(1 + \sqrt{7}) \\ & & k &= -6 \end{aligned}$$

Also a good check.

Solve.

$$x^2 + 5x - 24 = 0 \quad \{-8, 3\}$$

$$\begin{aligned} x^2 + 8x - 3x - 24 &= 0 \\ x(x+8) - 3(x+8) &= 0 \\ (x+8)(x-3) & \end{aligned}$$

HW

worksheet #s 9-19odd, 16, 20

ex 3:

 $\{-.5, 4\}$ ex 1:  
 $\{-5, 3\}$ ex 2:  
 $\{4, 6\}$ So for  
ex 3:  $\frac{7}{2}$   
sum =  $\frac{7}{2}$   
product = -2